DEPARTMENT OF ENERGY

Fusion Plan Gathers Steam

Stunned last year by a massive cut in the U.S. fusion budget, advocates have rallied around a plan to preserve the field at a price not much higher than current spending levels. And the campaign seems to be paying off: This week the White House asked Congress for a $21 million increase for the program in the 1997 fiscal year that starts on 1 October.

The $244 million fusion program is a small part of the overall $2.6 billion research budget for the Department of Energy (DOE). But its plight is a good example of the hard realities of today's budget climate, in which trade-offs have replaced add-ons in government funding for science. "There's been an awakening in the community," says Michael Knotek, the Pacific Northwest Laboratory manager who chaired the advisory group that developed the new plan. "We were hit with a hammer, and focusing on new goals is our step to recovery."

In the past few weeks Knotek has joined DOE managers, industry officials, and university researchers in buttonholing lawmakers, congressional staff, media, and senior DOE and White House officials. The goal is to win support for a plan that would sustain the domestic program, step up the search for alternative technologies, and maintain a foothold in the planned International Thermonuclear Experimental Reactor (*Science*, 2 February, p. 592). The plan comes with a minimum annual price tag of $250 million—just $6 million more than the 1996 level. Last month dozens of lawmakers from both parties signed a letter backing the report's strategy.

The president's 1997 budget has requested $265 million for fusion, just enough to keep the Tokamak Fusion Test Reactor (TFTR) at the Princeton Plasma Physics Laboratory operating until 1998. If Congress approves a budget below $250 million, the panel recommends that DOE shut down TFTR rather than make cuts in other parts of the program. House members who have endorsed the report say that a $275 million budget is needed to keep the United States firmly in the fusion game at a time when Europe and Japan are spending twice as much.

None of the numbers approaches the $366 million the program received in 1995. But some congressional skeptics may want to see even more belt-tightening. "Forty years and $14 billion," scolded Representative Dana Rohrabacher (R–CA) at a 7 March hearing of the House Science Committee's energy and environment panel, which he chairs. "If we keep shoveling money out of the back of the truck, nobody is going to get more efficient."

Despite those comments, Rohrabacher did not propose making drastic cuts to the program. Neither did the scientists testifying at the hearing, although they offered several ways for DOE to get more bang for its buck.

Fusion researcher William Drummond, of the University of Texas, Austin, would like to see a greater emphasis on basic research. He criticized the current effort as a "narrow developmental program" that has strangled the work of theorists. George Miley, director of the fusion studies laboratory at the University of Illinois, Urbana, called for more analysis of where the program should be headed. John Perkins, who works on the magnetic fusion energy program at Lawrence Livermore National Laboratory, recommended that one fourth of the fusion budget go toward alternatives to tokamaks. And Clifford Surko, a physicist at the University of California, San Diego, warned that the lack of small-scale university fusion experiments is keeping young people from entering the field. None of these critics, however, agreed on a clear alternative to the new DOE plan.

Knotek and Robert Conn, an engineer from the University of California, San Diego, who chairs DOE's Fusion Energy Advisory Committee, insist that the report pays heed to all these concerns. Five percent of the budget would be set aside for basic research, Conn told the committee, while there would be a shift from large-scale to small- and medium-sized experiments. In addition, the search for alternatives would be reopened after a decade-long hiatus.

DOE's new plan is the only coherent blueprint for a scaled-down fusion program currently on the table. But its backers insist that its success depends on a minimum budget of $250 million: If Congress fails to come close to what the Administration is asking for, the strategy breaks down. And despite warm words of encouragement from supporters, Knotek knows that it's much too early to predict the program's final budget. "At this point, you can't get numbers out of anyone," he says.

–Andrew Lawler

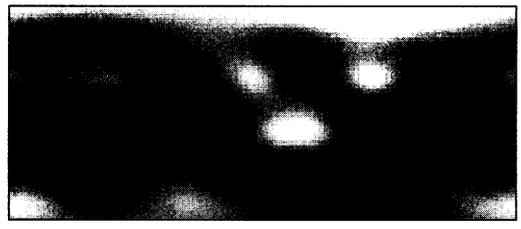
ASTRONOMY AND ASTROPHYSICS

Crunch Ahead for Space Science

This year should be the busiest in history for U.S. space science, with a launch scheduled nearly once a month and existing missions sending back a slew of astronomical data. It may also be a high-water mark for the field. "There is not enough money to support brand-new missions," says Wes Huntress, who heads the $2 billion space science program at the National Aeronautics and Space Administration (NASA). "We expect a declining budget."

This week the president asked for $175 million less in 1997 for the program, which now spends $1.1 billion on physics and astronomy missions, $672 million on planetary programs, and $230 million to launch spacecraft. But what troubles Huntress is an even steeper decrease over the next 5 years as NASA's budget, like other areas of government spending, continues to get squeezed by the arithmetic of eliminating the federal deficit. "We see the writing on the wall," says Anneila Sargent, an astronomer at the California Institute of Technology and chair of NASA's space science advisory committee. "The outlook looks very bleak."

Some scientists say the cut over the next 7 years could be as big as 30% in inflation-adjusted dollars. Their concern is shared by lawmakers, who worry that space science will be the sacrificial lamb as NASA's overall budget continues to fall. "[Space science] has been the crown jewel of the American space program since Apollo," says Representative James Sensenbrenner (R–WI), who chairs the House Science Committee's space panel. "We must ensure it does not fall out of the equation." Especially vulnerable, says Huntress, are proposed missions such as Fire and Ice, spacecraft that would probe the extremes of the solar system, from the sun to Pluto. If the Pluto mission does not materialize, he adds, it would cast doubt on the future of the Jet Propulsion Laboratory in Pasadena, California, which has specialized in planetary probes.



JPL

Fleeting image. The surface of Pluto as seen by Hubble telescope; plans for a visit are in jeopardy.

The problem is that space science must compete for fewer dollars at a time when some programs are untouchable, others are expanding, and still others are already earmarked for heavy cuts. The space station's $2.1 billion annual budget is protected by an agreement between the White House and Congress, for example, and the life and microgravity science